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EXAMINER
ARCOS, CAROLINE H

ART UNIT	PAPER NUMBER
2109	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/643,587	KLAUSLER, PETER M.	
	Examiner	Art Unit	
	Caroline Arcos	2109	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *31 August 2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-24 have been examined and are pending.

Information Disclosure Statement

2. The IDS is objected. The list of the US patent No 10643742, 10643585, 10235898, 6922766, 10643769, 10643754 and 10643758 in the IDS have not been considered because they do not meet the correct format. IDS has to meet the correct format where there is no place for the examiner to initial and signature next to the IDS.

Specification

3. The disclosure is objected because of the following informalities:

- The applicant is missing Application Number/ Serial Number of co-pending application on PG. 1, Line 12, 13, 14, 15, 17, 18, 20, 21 and 23, PG.8, Line 24 and PG.9, Line 15.
- The applicant mentioned reference number 120 on PG. 5, Line2 and software environment 200 on PG.6, Line8 and 25, which are not supported by the drawing.
- CRAY X1, CRAY T3E, UNICOS/mp have to be capitalized because of trademark use of system names.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 9 & 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claim 9 points out that at the processor executes the operating environment from the memory, which is logically incorrect. Examiner interprets that the operating system or operating environment runs from at least one processor that is connected to memory.

Claim 12 is not clear because the claim recites" The processors executing the threads reside on at least a first multiple processor unit and a second multiple processor unit of at least one multiple processor units, and wherein the operating environment migrates threads executing on the second multiple processor unit to the first multiple processor unit on the location of the processors." 1st multiple processor unit and the second multiple processor unit doesn't reside in a multiple processor unit. Examiner interprets the limitation is the threads are executed by processors that reside on 1st multiple processor unit and a second multiple processor unit wherein the operating environment migrates the threads from one multiple processor unit to another.

Claim Rejections - 35 USC § 101

7. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

8. Claims 17-24 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim 17 recites a computer-readable media. A computer readable media can be any media including radio-link or wave which are not statutory.

Claims 18-24 are rejected for failing to cure the deficiency of the above rejected non-statutory claim 17.

Double Patenting

9. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

   A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

   Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-24 provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-21 of copending Application No. 10/643,769 and in view of Gillespie (US 6,269,391). . Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following:

The claims of both applications recite a method a program unit comprising; starting a process within an operating system, starting a plurality of threads/ program units within an operating system, where the "plurality of program unit" are "threads" in co-pending application. However Gillespie teaches the above limitation and the "context-shifting event" is "entering

kernel mode"

The instant application does not recite, "If the first stream must block, then blocking the execution of other streams of plurality of streams" . However, Gillespie teaches the above limitation (abs, line 7-9 "Execution exclusion sets may be created and enforced by an execution exclusion set module to limit execution to a single thread at a time out of any particular execution exclusion set of threads.")

The modification would be obvious because of ordinary skill in the art would be motivated to limit execution to a single thread for better performance.

The instant application has synchronization, which would be obvious to one of ordinary skill in the art at the time of the invention to have synchronization for more efficient scheduling techniques.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5-11 & 13-24 are rejected under 35 U.S.C 102(b) as being anticipated by B. Gillespie (US 6,269,391)

As per Claim 1:

Gillespie Discloses:

- A method for scheduling program units, the method comprising (Column 3, lines 21-23 "the scheduling kernel 20, or scheduler 20, operates as an "execution scheduler" by ordering threads for execution by a processor").

- Starting a process within an operating system (Column 4, lines 18-19) "In general, any thread is initialized or started at some executable instruction ") within the operating system, the process is started (Column1, line 56-58 "it is a primary object of the present invention to provide a multi-processor scheduling kernel for a multi-processing operating system.")

- Starting a plurality of program units within an operating system, the program units associated with the process system (Column 3, lines 32-33 "A group of threads may sometimes be referred to as a task, a process, application, virtual machine, or the like."), and (Column 4, lines 18-19) "In general, any thread is initialized or started at some executable instruction ") within the operating system, the plurality of program units are started (Column1, line 56-58 "it is a primary object of the present invention to provide a multi-processor scheduling kernel for a multi-processing operating system.")

- Upon the occurrence of a context shift event, (Column 3, lines 36-3 " In order to alter such scheduling or arrange such scheduling, a scheduler 20 must perform a context switch 32") where "context switch" is a "context shift" as claimed

- Synchronize the scheduling of each of the plurality of program units (Column 7, line 36-37 "A synchronization module 72 may provide synchronization of CPU-specific and global data 62, 64 "), and (Column 3, lines 35-37 "The point of having a scheduler 20 is a

determination of which thread or which group of threads out of several in question should be executed. ")

- **Setting the context of each of the plurality of program units to process the context shift event.** (Column 3, lines 45-53 "For every thread, there exists a thread-control object 30 in memory 16. A portion of the thread-control object 30 is a data block that represents the state of the processor for executing the associated thread. During a context switch 32 one may think of an object 30 or a thread-control object (TCO) 30 corresponding from a falling thread and a thread control object (TCO) 30 of a rising thread.") Where " thread-control object" is the context of each of the plurality of program units as claimed

As per Claim 2:

Claim 1 is incorporated and further Gillespie Discloses:

- **The program units comprises a thread** (Column 3 lines 32-33 "A group of threads may sometimes be referred to as a task, a process, application, virtual machine, or the like.")

As per Claim 3:

Claim 2 is incorporated and further Gillespie Discloses:

-Each of the threads are executed on a separate processor (Column 1, lines 65-67 "The multi-processor scheduling module may select, from a plurality of virtual machines, a virtual machine to be executed by a processor included in the multi-processor."), where the "virtual machine" is a "group of threads" (Column 3, lines 32-33 "A group of threads may sometimes be referred to as a task, a process, application, virtual machine, or the like.").

As per Claim 5:

Claim1 is incorporated and further Gillespie Discloses:

-**The context shifting event comprises an exception** (Column 4, line 26-27 "A yield event 44, (signal~ command, data~ etc.) may be received from an interrupt, a currently executing thread, or the like.") , where "interrupt" is an "exception" as claimed.

As per Claim 6:

Claim 5 is incorporated and further Gillespie Discloses:

- **The exception comprises a signal** (Column 5, lines 58-59 "A yield signal 44 or yield command 44 will result in a context switch 32 by the multi-processor scheduling module 22"), where " a yield signal" is an " interrupt", and " an interrupt" is an "exception" that created a signal as claimed.

As per Claim 7:

Claim 1 is incorporated and further Gillespie Discloses:

- **The context-shifting event comprises a non-local go to** (Column 3, line 54-62 "A mechanism 32 responsible for performing a context switch will typically be passed two addresses 45, a first address for storing the context information in the TCO 30 of the falling thread, and an address from which to draw the context information out of the TCO 30 of the rising thread. Thus, both the state of the processor for executing the thread that is rising, as well as a pointer to the actual executable code of the thread (an instruction pointer) are included in the context information° Since, the context shift is a command or instruction received by an interrupt. Non- local go to is an instruction that transfers the execution to another statement outside the scope of the executed thread which is implied in the teachings of Gillespie. Gillespie teaches that during a context shift two addresses will be passed; the falling threads (currently executed thread) which is a local

thread and the rising thread where the new executing is taking place outside the scope of the falling threads.

As per Claim 8:

Claim 1 is incorporated and further Gillespie Discloses:

- **The context-shifting event comprises a system call**. The instant application recites that context shifting event is a system call, where Gillespie teaches context shifting. Hence context shifting is a system call.

Claims 9-16 are system claims, corresponding to the method claims 1-8 respectively and are rejected under the same reason set forth in connection of the rejection of claims 1-8 above and further, Gillespie teaches that the system comprises at least one processor unit having plurality of processors as claimed (Column 1, lines 65-67 "The multi-processor scheduling module may select, from a plurality of virtual machines, a virtual machine to be executed by a processor included in the multi-processor"),Fig. 1 describes a memory"16" coupled to the plurality of processors "12a", "12a" and "12c" , as claimed (Column 14, lines 45-46 "a plurality of processors, operable connected to the memory device") , and operating environment executed by at least one of the processors connected to memory and operable to perform the task as claimed (Column 3, line 15-18 "An operating system's kernel is sometimes defined as including not only scheduling software but also memory management functions interrupt services, and so forth.")

Claims 17-24 are computer readable media claims corresponding to the method claims 1-8 respectively and are rejected under the same reason set forth in connection of the rejection of claims 1-8 above and further Gillespie teaches that memory is a type of computer readable

media and codes are instructions as claimed (Column 3, line 24-25 " It is important to recall that a thread is merely a logical entity of code.").

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 4, 12 & 20 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Gillespie (US 6,269,391) and Pennello (US 7162713 B2)

As per Claim 4:

Claim 3 is incorporated and further Gillespie Discloses:

- The processors executing the threads reside on at least a first multiple processor unit and a second multiple processor unit (Column 4 lines 8-10 "A multi-processing scheduling module 22 provides scheduling for several virtual machines executing in a multi-processor 10. "), (Column 1, lines 65-67 "The multi-processor scheduling module may select, from a plurality of virtual machines, a virtual machine to be executed by a processor included in the multi-processor"), and (Column 4, line 63-67 " The multi-processor scheduling module 22 may itself be instantiated in several instances, each associated with one processor 12 (12a, 12b,

or 12c) of the several processors 12a, 12b, 12c available in a multiprocessor 10 or a multi-processing environment 10")

Gillespie does not specifically disclose "migrating threads executing on the second multiple processor unit to the first multiple processor unit", however, Pennello discloses the above limitation. (Column 12, line 7-8 "the present invention may be used when migrating a given program from one processor to another "), and (column 3, line 18-21 "The present invention satisfies the aforementioned needs by providing an improved method and apparatus for analyzing data strings, particularly in the multi-processor environment")

It would be obvious to one of ordinary skill in the art at the time of the invention was made to incorporate the teaching of into Gillespie method because one of ordinary skill in the art would be motivated to recover fault after a processor crashed, and a process migration facility provides a mechanism to suspend the execution to a process at one processor to transfer the state of the process to another processor, and to resume the execution of that process thus increase the efficiency of the execution.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

TITLE: Method of starting execution of threads simultaneously at a plurality of processors and devices therefor, US 6675191 B1

TITLE: Apparatus and method for interrupt handling in a multi-threaded operating system kernel, US 5515538

TITLE: Thread switch control in a multithreaded processor system, US 6567839 B1

TITLE: symmetric multi-processor system, US 7103631 B1

TITLE: Operating system for a multi-tasking operating environment, US 5012409 A

TITLE: Method for interconnecting and system of interconnected processing elements by controlling network density, US 5313645 A

TITLE: Parallel process scheduling method in a parallel computer and a processing apparatus for a parallel computer, US 5781775 A

TITLE: Multiple parallel-job scheduling method and apparatus, US 6247169 B1

TITLE: Structured exception-handling methods, apparatus, and computer program products, US 6247169 B1

TITLE: Thread signaling in multi-threaded processor, US 7111296 B2

TITLE: Method and apparatus for optimizing performance in a multi-processing system, US 7143412 B2

TITLE: Stream management in a multithreaded environment, US 7191444 B2

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caroline Arcos whose telephone number is (571) 270-3151. The examinercan normally be reached on 7:30AM -5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chameli Das can be reached on (571)-272-3696. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Caroline Arcos

Patent Examiner

A.U. 2109

Chameli Das

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SUPERVISORY PATENT EXAMINER

4/30/07